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SAPC-5081
Copy / of 8

6 April 1956

MEMORANDUM FOR THE RECORD

THROUGH : Contracting Officer 4/10/56

SUBJECT : Report of Visit to Hycon Manufacturing Company, Pasadena, California, and to the Site

1. Period of time spent at Hycon Manufacturing Company -- From 6 March to 12 March 1956, inclusive.

2. Period of time spent at the Site -- From 13 March to 15 March 1956, inclusive.

3. On my return from the Site on 15 March, I spent the time up to my departure for Washington with [redacted] Hycon. The purpose was to review findings at the Hycon Plant and at the Site and to discuss approaches to the various problems. 25X1

4. By inserting latest information, an attempt has been made to bring this report up to date.

Personnel Contacted:

1. At Hycon a large number of personnel were introduced to me; however, only those pertinent to our mission have been noted under their appropriate specialties.

2. At the Site, I personally talked to each member of the Hycon Test Group and to members of Detachment A.

[redacted] 25X1

I TRACKER (70 mm)

At the Hycon Manufacturing Plant, I saw [redacted] 25X1
He stated there are five or six 70 mm cameras at the Site. Although malfunctions exist, they are of a minor nature. He further stated that an Instruction Manual exists. Its title is "Maintenance and Operating Manual for 70 mm (Model 151) Data Recording Camera", dated February 23, 1956. I requested that P & E send us a copy of the manual at their earliest convenience.

While at the Site, I talked to [redacted] regarding his photo- 25X1
graphic problems. He definitely felt his Detachment was not ready to move out because of unreliability of his photographic equipment. I talked to Dick Busse and we ran through the subject of 70 mm photography. Busse had a minimum of interpretation equipment and all of questionable quality. No 70 mm spools available.

Seventy (70) mm photography ranged from poor to good. Representative samples were obtained as were the mission logs. They are in our files. Representative tracker malfunctions on missions of March 9 were as follows: clock out of focus, loose micro switch, film underexposed, and camera controlling aperture slit slipped on shaft.

Action or Recommendation:

1. This office has requested two new portable light tables from WADC; one to go to the Detachment and another to [redacted] Steps 25X1
are being taken to order ten new light tables through WADC.

2. Representative samples of 70 mm photography were shown to Rod Scott on his 22 March trip to Headquarters.

3. I intend to see [redacted] P & E, in Connecticut during the 25X1
week of April 23 to discuss more fully the maintenance problems of 70 mm cameras and malfunctions of the camera.

4. I am in agreement with the Site personnel that the Hycon personnel are not competent to maintain the 70 mm camera and to make field fixes. P & E should have an engineer available to the Site personnel for both engineering services and check-out of Hycon personnel on the tracker.

II A-1 CONFIGURATION

25X1

[redacted] - A Configuration Project Engineer
Design Engineer (Shutter)

The following changes will be incorporated in the cameras being prepared at the Plant for use with the various Detachments.

1. In the A-1, the following data will be recorded on the film:

   a. Time of day
   b. Calibrated focal length
   c. Lens serial number
   d. Flight number
   e. Step wedge - Standard light source will be utilized within data chamber. Plan is to use step wedge for processing control.

   Some difficulty is being encountered in proper recording of step wedge. Step wedge strip is not being recorded in proper increments. A fix is being attempted.

2. The problem of clock malfunctions has been solved.

   a. Stoppage:

      Clocks came without backs. As steel housing was screwed into brass casing, chips entered clock works. Clocks now have protective backs.

   b. Lighting:

      The angle of the lamp used to illuminate the clock face was changed. A diaphragm was inserted to eliminate glare from light source. A flat crystal will replace the rounded crystal if needed.

3. Indicator Lights: Agastats will be used. This system will not indicate all shutter failures, but any failure which will cause a bind within the camera system will cause the light to go out. Generally speaking, this system will detect about 85% - 90% of all camera failures. The remaining 15% - 10% can be lessened by good pre-flight checks and preventative maintenance. I requested and was assured wiring diagrams for the Agastat system

would be sent to us as soon as they are available.

The question of separate indicator lights for the three Charting Cameras and the one Rocker was discussed. [redacted] stated it could be done simply and with minimum design. I was notified by [redacted] on 2 April that separate circuits and lights will be incorporated in "A-1's". 25X1 25X1

4. Manuals: Discussed revision, simplification and standardization of Sequence Diagram and Trouble Shooting Charts for both the 730 and 731 systems. For example, a time sequence would help in simplifying charts. Design will be "frozen" the end of March. At that time, the revised manuals will be thoroughly checked and prepared for publication.

III CONFIGURATION B

25X1

[redacted] - Project Engineer

1. Question: What happens to the camera when "B" is shut off at some oblique position?
   Answer : In either Mode 1 or Mode 2, the camera will always complete its sequence and stop in a vertical position. As it can not discriminate, this vertical can be either the No. 5 or No. 10 position.

2. For "B" type photography, a light blip will be used to indicate those exposures which were taken in vertical position. This indicator will be used for both the Mode 1 and the Mode 2.

IV GENERAL DISCUSSION

1. AO will be installed to gather material for Configurations B and C.

2. Some unknowns still exist as to where frosting occurs in mission profile. [redacted] and I discussed methods which could be used to detect time of frosting. [redacted] expressed the view that, if frosting becomes a problem, a field fix could be made. I expressed my doubts and my reasons. 25X1 25X1

3. On the "C" Configuration, because of its size and complexity, an attempt will be made to insulate equipment bay and to provide heaters with multiple thermostats for cold spots.

4. I recommended that AC data be obtained as soon as possible for Configurations B and C. I also felt that the above approach to the problem would be further complicated by the three large windows needed for Configuration C. Refer to Para 3

V CONFIGURATION C

[redacted] - Project Engineer 25X1

1. Reviewed preliminary Project Plan for Configuration C. I was assured we would receive the Project Plan as soon as possible.

2. My greatest concern with Configuration C is the "Dead Zone" in Mode 1 (Burst) and the lack of sufficient overlap in Mode 2 (Single Strip) particularly in targets of linear dimension on an angle of 45° to 65° from flight line. Because of the "Dead Zone" in Mode 1, bursts of eight photos will not cover linear targets.

3. Due to inherent characteristics of component units of the "C" performance, Mode 1 can not be improved. Therefore, the approach is to improve Mode 2 operation in order to record target types not sufficiently covered by Mode 1.

4. In order to increase performance of Mode 2, design of "C" would be simplified due to elimination of automatic speed changer and Mode 2 switching. Elimination of these extras would increase reliability of camera, would give overlap up to 60%, angle of coverage across line of flight would increase from 45° to 65°. This coverage would not be in stereo but there would be continuity in photography. Total coverage would be less because of increase in cycling time, four to two sec/cycle.

Action Taken:

1. I discussed the problems with [redacted] 25X1
and Lundahl, and finally with [redacted] on 3 April 1956. [redacted] agreed 25X1
the performance would be increased; however, he thought the stereo angle would be so small it would be of little help. Our feeling is that viewing of triplets would increase the stereo base. He will take steps to pass on our suggestion to Hycon for incorporation in the design of Configuration C.

2. In my discussion with Messrs. [redacted] 25X1
[redacted] while at Hycon, they were all in agreement that our suggestion 25X1

was good but that we would have to clear it through [redacted] This has now been accomplished. 25X1

VI OVERHAUL TIME

1. An attempt was made to get more realistic values for overhaul time of configuration. [redacted] however, indicated a proposal will be made to us in which only parts or subassemblies of configurations will be sent back for factory overhaul. For example, shutters, magazines, case drives, solenoid valves, etc., would be returned from A-1's or A-2's. On "B's", programmers, mini-vibs, cassettes, motors, etc., would be returned. It is possible on occasion a complete configuration consisting of components to be overhauled would be sent back at one time. A study of this proposal may indicate it will decrease the time a configuration would be inactive; however, the spare parts list may be increased appreciably. 25X1

2. Both [redacted] indicated they had no knowledge of the number of A-1, A-2, B and C sorties contemplated. This type of information would be helpful in their planning for overhaul and spare parts. 25X1

VII THIN BASE FILM

[redacted] agree that physical properties of thin base film are satisfactory and that this type of film necessitates extreme care in camera adjustment. Failure is due to maladjustments and not to deficiencies in film. 25X1

VIII CAMERA HATCHES

1. Theoretically, hatches are supposed to be interchangeable; however, in order to take a hatch from one aircraft and adapt it to another, it takes from four to six hours. In the earlier phases of the test program, this lack of rapid interchangeability has resulted in the test aircraft flying without the camera configuration, although photo equipment was available in aircraft. ~~It was aborted however due to mechanical failure in pre-flights.~~ This condition still exists but it is no longer a major problem. Latest figures (March 15, 1956) show the following:

A-1 hatches -- 12	B hatches -- 1
A-2 hatches -- 12	C hatches -- 5

2. At the Site, each aircraft has an A-1 hatch with the exception of Aircraft No. 4 which has a B hatch.

IX GROUND SUPPORT EQUIPMENT

[redacted] -- Project Engineer (Ground Support Equipment) 25X1

1. All equipment, mandatory and essential, will be available the third or the fourth week of March. Detachment A is about 80% complete. Detachments B and C will receive all their equipment about two weeks after Detachment A has been equipped (or, about April 15th).

2. All manuals may not be ready in time to accompany the equipment.

3. To prevent the configuration from tumbling off the transport dolly during movement to and from flight line, [redacted] is in the process of installing two (2) four-inch steel bands, one at either end of the cart. It was suggested that the steel bands be set at an angle for greater rigidity and the system be one of quick and simple release. 25X1

4. As per custom, while out at the Site, I observed pre-flight checks and assisted in the installation of a configuration in an aircraft (in this case the configuration was an A-1). Due to the small clearance between the configuration and the floor, a portion of the pre-flight must be accomplished after the configuration has been raised into the aircraft; i.e. setting shutter speed, checking clock and inserting sortie number on the clock face, recording data, etc. It was suggested to [redacted] that it might be helpful to complete pre-flight in their service building by utilizing a hoist and devising a simple raised rack which would permit technicians to work in comfort with consequent greater attention to detail and less exposure of camera configuration and personnel to the elements. With this system, after a configuration has been hoisted into place within the aircraft, only connections would have to be made and lens caps removed. [redacted] was given two simple design suggestions for such a rack. He stated that he would look into the problem and that he thought it was worth investigating. 25X1 25X1

5. Test and repair equipment and other types of support equipment are available at the Site. However, the majority of Hycon personnel are not aware of its correct utilization. [redacted] confirmed this statement in conversations with me. Although he was suppose to stay at the Site for only one day, he remained until Thursday, March 15, to indoctrinate Detachment and test program personnel. 25X1

X GENERAL CONCLUSIONS

1. Taking into consideration the shortcomings of the general knowledge -- i.e. lack of working space, personnel overwork due to need to support both test and Detachment A operation programs, etc. -- the major problem is one of personnel.

Specifically:

A. Training is not at a level whereby personnel can do their assigned tasks with confidence and assurance.

B. Personnel are not thoroughly acquainted with the ground support equipment.

C. Personnel are acquiring work habits which can prove to be detrimental to success of the mission -- i.e. slip-shoddy pre-flight, installation and maintenance techniques.

2. The above problems can be further aggravated when it is remembered that Hycon has proposed to have all of its team members equally familiar with each others duties. This is a noble idea, provided that each member is thoroughly trained in all phases of testing, operation and maintenance of camera equipment and supporting components. Another item to keep in mind is that once the Detachment goes out on its own the engineers from Hycon will not be readily available to them; consequently, any gaps in the Detachment members' training or knowledge will become more critical in reference to fulfillment of the mission.

3. The above deficiencies were discussed with [redacted] 25X1
[redacted] and others directly concerned with the training of Hycon 25X1
personnel. Hycon executives were in general agreement with these findings; however, some including [redacted] as late as his last visit to Head- 25X1
quarters, indicated that they felt the problem was not of major concern.

4. During my three-day period at the Site, three meetings were held for Hycon personnel. The first meeting was called by [redacted] 25X1
the second by [redacted] and the third by [redacted]. Although I 25X1
was not present at any of the meetings, it is my understanding that the first and third sessions dealt with the above deficiencies and emphasized the need for care and conscientious effort. The second meeting by [redacted] was 25X1
a result of his findings that Hycon personnel were not familiar with ground support equipment. The essence of his talk was to introduce members to equipment available, its purpose, etc.

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5. In conclusion, under the best of conditions, deficiencies in techniques or knowledge can lower probabilities of success. When an element of uncertainty from the standpoint of equipment is interjected, the point of personnel deficiencies assumes greater importance.

25X1

LSK:gjg (6 Apr 56)

Distribution:
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2-Deputy Project Director
3-Director of Operations
4-OCTROI Master
5-AQUATONE General
6 [redacted] 25X1
7-Project Chrono
8-Project Reading